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SPECIFICATION FOR DENTAL COBALT-CHROMIUM CASTING ALLOY

(*First Revision*)

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NEW DELHI 110002

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Indian Standard

SPECIFICATION FOR DENTAL COBALT-CHROMIUM CASTING ALLOY

(First Revision)

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Indian Standard
SPECIFICATION FOR DENTAL COBALT-CHROMIUM CASTING ALLOY
(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 31 January 1985, after the draft finalized by the Precious Metals Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 Cabalt-chromium alloys are used for casting skeleton dental appliances, such as denture base, partial denture skeletons, and occasionally certain types of bridgework. These alloys are lighter in weight and possess good mechanical properties. They are corrosion resistant because of the passivating effect of chromium and are less expensive than gold alloys. These alloys are harder than gold alloys even though the latter are age-hardened. Further, according to experimental evidence, the greater hardness of these alloys produces no abrasion of the enamel.

0.2.1 Some of the typical compositions of cobalt-chromium casting alloys are given in Appendix A.

0.3 The standard was first published in 1974. In this revision MKS units have been changed to SI units.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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*Rules for rounding off numerical values (revised).

1. SCOPE

1.1 This standard covers the requirements of cobalt-chromium casting alloys used in removable partial denture prostheses and appliances other than surgical implants.

2. SUPPLY OF MATERIAL

2.1 General requirements relating to the supply of material shall conform to IS : 1387-1967*.

3. GENERAL REQUIREMENTS

3.1 When melted and cast in accordance with the manufacturer's instructions, the alloy shall conform to the mould and shall, after removal of adhering investment material, be free from porosity and deleterious inclusions visible to the unaided eye.

4. CHEMICAL COMPOSITION

4.1 The chemical composition of the material shall be within the limits prescribed below:

Cobalt + chromium + nickel : not less than 85 percent
wherein chromium : not less than 20 percent.

4.2 Method of Analysis — Shall be a matter of agreement between the manufacturer and the purchaser.

5. TENSILE PROPERTIES

5.1 Preparation of Test Piece — Test pieces shall be cast using the melting procedure recommended by the supplier

5.2 The test specimen shall be circular cross-section with a diameter of 2·0 to 2·5 mm and of sufficient length to allow a gauge length of 25 mm. Specimens shall be tested in the as-cast condition except that they may be cleaned by sandblasting, and fins and nodules may be removed. Four such specimens shall be prepared.

5.3 The mechanical properties of two test specimens, when determined in accordance with the method given in IS : 1816-1979†, shall have the following tensile properties:

0·1 percent proof stress, *Min* : 440 MPa
Elongation on 25 mm gauge lenth, *Min* : 3 percent

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*General requirements for the supply of metallurgical materials (*first revision*).
†Method for tensile test for light metals and their alloys (*first revision*).

6. RETESTS

6.1 Should either of the test specimens fail to meet the requirements of **5.3**, two further test specimens representing the same batch shall be tested. The alloy shall be deemed to comply with this standard only if both the additional test specimens meet the requirements of **5.3**.

7. INFORMATION TO BE PROVIDED BY THE SUPPLIER

7.1 Instructions for melting procedure, including the fusion temperature as determined by the liquidus temperature shall be provided by the supplier.

8. MARKING

8.1 The material shall be marked clearly with the following information:

a) Name or trade-mark of the manufacturer,
b) Weight of the contents of the package,
c) Batch number,
d) Date of manufacture (year and month), and
e) Composition of the alloy.

8.1.1 The material may also be marked with the ISI Certification Mark.

Note — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

APPENDIX A

(*Clause* 0.2.1)

TYPICAL CHEMICAL COMPOSITION OF DENTAL COBALT-CHROMIUM ALLOYS

Alloy No.	Percent								
	Chromium	Cobalt	Nickel	Molybdenum	Tungsten	Manganese	Silicon	Iron	Carbon
*1	26·2	62·6	2·3	5·0	1·2	0·16	0·55	1·0	0·2-0·4
†2	35·0	65·0	—	4·0	—	—	—	—	—
3	26·0	66·0	—	6·1	—	—	0·4	1·6	0·2-0·4
4	24·0	66·0	—	5·1	—	—	0·6	4·0	0·2-0·4
5	27·3	66·7	—	—	5·0	0·4	0·2	0·05	0·2-0·4
6	26·0	66·0	—	5·6	—	—	1·0	1·6	0·2-0·4
7	26·0	65·0	—	8·0	—	—	0·1	0·8	0·2-0·4
8	27·0	62·6	2·0	6·0	—	0·6	0·6	1·0	0·2
9	23·0	67·4	2·0	—	5·0	0·6	0·6	1·0	0·4

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*Contains copper 0·20 percent.

†Unspecified content 1·0 percent.

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